ASYS Automatisierungssysteme GmbH
P 27910 DE

CLAIMS

1. Method for the testing of substrates (1) provided with a predetermined pattern,

in which an actual pattern (1a), applied to a substrate (1) by means of a printing or structuring process (3, 4), is optically detected (6),

the optically detected actual pattern (1a) is compared (8) with a desired pattern,

in dependence upon the comparison (8) and taking into account permissible tolerances, it is determined to which further process the observed substrate (1) provided with the actual pattern (1a) is to be delivered,

characterized

in that the optical detection (8) of the actual pattern (1a) is effected in the form of digital data with the formation of an actual data set (7),

in that a desired data set is formatted (2) from control data for the application of the pattern onto the substrates, and

in that data processing is carried out to the effect that the desired data set and the actual data set are compared (8) datawise with one another taking into account permissible tolerances.

2. Method according to claim 1,
characterized

in that the application of the pattern onto the substrates (1) is effected by means of a process employing a correspondingly constituted template, and

in that the desired data set is formatted (2) from the control data (4) employed for producing the template.

3. Method according to claim 1 or 2,
characterized in that,

selected sections ($1a_1$, $1a_2$, $1a_3$, $1a_4$) of the desired pattern are subjected to the testing (8).

4. Method according to any of claims 1 to 3, characterized in that,

different tolerance data subsets are associated with various sections ($1a_1$, $1a_2$, $1a_3$, $1a_4$) of the desired pattern.

5. Method according to any of claims 1 to 4, characterized in that,

data processing (5) can be carried out to the effect that there is effected an editing of the respective data sets with regard to the sections to be compared ($1a_1$, $1a_2$, $1a_3$, $1a_4$) and/or the associated tolerances.

6. Method according to any of claims 1 to 5, characterized in that,

the optical detection (6) is effected pixel-wise by means of a digital camera.

7. Method according to claim 6, characterized in that,

for the optical detection (6) there is effected a relative movement between the digital camera and the substrate carrying the actual pattern.

8. Method according to claim 7, characterized it that,

the digital camera is a linear camera one pixel wide, the length of which corresponds to one linear dimension of the region of the actual pattern on the substrate to be tested, and the relative movement is effected with a step size of one pixel perpendicularly to the one linear dimension.

9. Method according to claim 8, characterized in that,

the linear camera is formed by means of linear sub-cameras arranged in a staggered manner.

10. Method according to any of claims 1 to 9, characterized in that,

the substrate (1), on which the actual pattern (1a) to be tested is applied, itself already carries at least one other pattern and the optical detection is so constituted or so carried out that it discriminates the actual pattern to be tested with respect to the other pattern and the substrate.

11. Arrangement for the testing of substrates (1) provided with a predetermined pattern having

an opto-electronic arrangement (6) for the detection of an actual pattern (1a) applied to the substrate (1) by means of a printing or structuring process (3, 4),

a comparator (8) which compares the optically detected actual pattern (1a) with a desired pattern and in dependence upon the comparison and taking into account permissible tolerances determines to which further process the observed substrate (1) provided with the actual pattern (1a) is to be delivered,

characterized

in that a converter (7) converts the pattern detected by the opto-electronic arrangement (6) into an actual data set in the form of digital data,

in that a formatting means (2) formats a desired data set from control data for the application of the pattern onto the substrates (3, 4),

in that the comparator (8) carries out data processing to the effect that the desired data set and the actual data set are compared datawise with one another taking into account permissible tolerances.

12. Arrangement according to claim 11, characterized

in that the application of the pattern onto the substrates (1) is effected by means of a process employing a correspondingly constituted template (4), and in that the formatting means (2) formats the desired data set from the control data employed for the production of the template.

13. Arrangement according to claim 11 or 12, characterized in that,

selected sections ($1a_1$, $1a_2$, $1a_3$, $1a_4$) of the desired pattern are subjected to the testing (8).

14. Arrangement according to any of claims 11 to 13, characterized in that,

different tolerance data subsets are associated with various sections ($1a_1$, $1a_2$, $1a_3$, $1a_4$) of the desired pattern.

15. Arrangement according to any of claims 11 to 14, characterized in that,

data processing (5) can be carried out to the effect that there is effected an editing of the respective data sets with regard to the sections to be compared ($1a_1$, $1a_2$, $1a_3$, $1a_4$) and/or the associated tolerances.

16. Arrangement according to any of claims 11 to 15, characterized in that,

the optical detection (6) is effected pixel-wise by means of a digital camera.

17. Arrangement according to claim 16, characterized in that,

for the optical detection there is effected a relative movement between the digital camera (6) and the substrate carrying the actual pattern.

18. Arrangement according to claim 17, characterized it that,

the digital camera (6) is a linear camera one pixel wide, the length of which corresponds to one linear dimension of the region of the actual pattern on the substrate to be tested, and the relative movement is effected with a step size of one pixel perpendicularly to the one linear dimension.

19. Arrangement according to claim 18, characterized in that,

the linear camera is formed by means of linear sub-cameras arranged in a staggered manner.

20. Arrangement according to any of claims 11 to 19, characterized in that,

the substrate (1), on which the actual pattern (1a) to be tested is applied, itself already carries at least one other pattern and the optical detection is so constituted or so carried out that it discriminates the actual pattern (1a) to be tested with respect to the other pattern and the substrate.

21. Application of the method according to any of claims 2 to 10, or use of the arrangement according to any of claims 12 to 20 for the testing of the template for faults arising in the course of use.